

City Of Franklin, Tennessee
Monticello Subdivision Sanitary Sewer Study

FINAL REPORT

February 20, 2007



SSR Project No. 06-41-050.0

Monticello Subdivision Sanitary Sewer Study

DRAFT REPORT

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I. Executive Summary

This study was authorized on November 14, 2006 by the Franklin Board of Mayor and Aldermen in order to evaluate the requirements for providing sanitary sewer service to the currently un-served areas of Monticello Subdivision.

A. Findings

- The existing as well as anticipated average daily flow from the Monticello Subdivision is listed below. These flows are based upon existing GIS data and billing data from the Franklin Water Management Department. Conceptual routes for proposed sanitary sewers to serve the un-sewered areas are shown in the study along with a cost estimate for constructing the sewer lines.

Contributions From:	Average Daily Flow	Peak Flows
<i>43 Existing Sewered Homes</i>	15,050 GPD	75,250 GPD
<i>109 Un-Sewered Homes</i>	38,150 GPD	191,000 GPD

- Currently, there would appear to be available capacity at the Franklin WWTP for the additional flow from the un-sewered areas of Monticello Subdivision.
- The City of Franklin has previously made provisions to collect sewage from the un-sewered areas in Monticello Subdivision by constructing a point of connection when the Fieldstone Farms pump station was designed and built. Flow will be collected at the northwest corner of Monticello, piped into an existing manhole for conveyance to the Fieldstone Farms pump station and pumped to the Franklin Water Reclamation Facility for treatment.
- Slopes in the Monticello Subdivision would appear to be adequate so that the main gravity lines could be installed at depths that would prevent areas outside the paved right-of-way from being disturbed.

B. Conclusions and Recommendations

This study recommends that the City:

- Accept this study as a tool for planning sanitary sewer service in the un-sewered areas of Monticello Subdivision.
- Design and construct 8" diameter gravity lines within existing City right-of-way to serve the currently un-sewered homes.
- Further evaluate the Fieldstone Farms pump station and, if necessary, provide additional or replacement equipment at the Fieldstone Farms pump station to provide adequate pumping capacity for 109 additional homes.

II. Description of Monticello Subdivision

The Monticello Subdivision is located in the northern portion of the City of Franklin. Located north of the Mack Hatcher Bypass and the Harpeth River at Hillsboro Road, the subdivision was constructed in the early 1970's and includes a total of 152 single family homes. The subdivision is situated on the western slope of a hill that ascends some 1,500 feet over the subdivision on its eastern edge. The subdivision does offer some topographic relief as the western boundary lies approximately 75 feet below the eastern boundary, providing a natural slope of approximately 5% from east to west. Exhibit 1 depicts the location of Monticello Subdivision within the northern Franklin area.

Due to subsequent residential development to the east of the subdivision and favorable natural topography, some 43 homes in the eastern portion of the subdivision are currently served by the City of Franklin gravity sewer system. However, 109 homes are currently served by septic systems. Williamson County Department of Sewage Disposal Management records indicate that approximately 34 repair permits have been requested and registered with that department since records have been kept. This

represents approximately 22% of the entire number of homes in the subdivision and 31% of the number of currently un-sewered homes. An overview of the disposition of homes relative to sewer service in the subdivision is listed below.

Monticello Subdivision	
<i>Total Number of Homes:</i>	152
<i>Homes with Sanitary Sewer:</i>	43
<i>Homes without Sanitary Sewer:</i>	109
<i>Number of failures:</i>	34

III. Projected Flows

Flows for the un-sewered areas of Monticello were developed by an actual count of homes in the subdivision. City of Franklin Water Management Department billing information was used to delineate the homes currently served by sanitary sewer from those not served. It is assumed that Monticello is currently built out – that no additional homes can be constructed in the subdivision. The property information was applied to GIS mapping and the resulting graphic data was created as shown on Exhibit 2.

Based on guidance of the State of Tennessee sewage works design manual, an incremental flowrate of 350 gallons per household per day was used to convert the number of homes in the subdivision to a flow that can be anticipated from the area. Based on recent census data, the City of Franklin calculates the average number of persons per household within the City to be 2.55. A peaking factor, based on population in the development and taken from ASCE “Sewer Design & Construction Manuals and Reports on Engineering Practice”, is then used to provide an estimate of the flow from Monticello during peak daily water use. Pipeline is sized using this peak flow projection. Flows from Monticello as well as standard peaking factors are outlined in the tables below.

<i>Area of Monticello</i>	<i>Number of Homes</i>	<i>Estimated Population</i>	<i>Estimated Ave. Flow (GPD)</i>	<i>Estimated Peak Flow (GPD)</i>
<i>Un-Sewered</i>	109	278	38,150	190,750
<i>Currently Sewered</i>	43	110	15,050	75,250

Tributary Population	Peaking Factor
<i>0 – 500</i>	5
<i>500 – 1000</i>	4
<i>1000 +</i>	3.25

Referring to the above table, the total average flow from the un-sewered area of the subdivision is estimated to be 38,150 gallons per day with a peak flow of 191,000 gallons per day. Using this information as well as localized topography, a conceptual routing and design for a gravity sewer collection system can now be established for the subdivision.

The area of the subdivision bordering the eastern side of Hillsboro Road and west of the existing residential development includes approximately 27 acres of undeveloped land with one existing dwelling. If this land were to be developed to the density found in the remainder of the subdivision, ½ acre lots, the result would be an additional 54 lots. However, the entire tract lies within the 100-year flood plain, as shown in Exhibit 4. In discussions with personnel from the Franklin Planning Department, no additional development is likely to occur on this property due to its status as flood plain property. As a result, no additional flows have been calculated from this tract.

IV. Proposed Sanitary Sewer

As previously stated, the City of Franklin has already developed a plan whereby additional sewer service could be brought to Monticello. A gravity sewer connection

was established on the eastern side of Hillsboro Road near the northern entrance to Monticello at the time the Fieldstone Farms infrastructure was installed. A pipe was installed and capped for future connection to a subdivision-wide collection system. This pipe provides a direct connection to the Fieldstone Farms pump station number 1, located just west of Hillsboro Road and north of the Harpeth River. Pump station number 1 includes three pumps, each rated for pumping up to 1,800 gallons per minute to the Franklin Water Reclamation Facility. The equipment at the pump station is reaching an age when a performance evaluation should be initiated to ensure that the pumps are operating at near the design capacity.

Approximately 43 homes in the eastern section of Monticello subdivision are currently served by gravity sewer. The flow from those homes drains to a pump station near the Fairways at Spencer Creek that pumps the sewage to the Water Reclamation Facility. Exhibit 3 depicts a conceptual design for an 8" gravity sewer to serve the remainder of the subdivision. The gravity lines would direct flow in a westerly and northerly direction and provide a point of collection north of the Poteat Place entrance of the subdivision. Gravity line would convey flow from this point west across Hillsboro Road to the Fieldstone Farms pumping station from which it would be pumped to the Franklin Water Reclamation Facility for treatment.

It is assumed that the gravity line can be constructed within existing City of Franklin right-of-way so that, although streets would need to be repaired after installation of the system, minimal disturbance would occur to existing tree lines, bushes and amenities in the subdivision. As listed in Table 1, the estimated cost for the installation of the gravity collection system in Monticello Subdivision as described in this report is \$1,643,600.00.

V. Recommendations

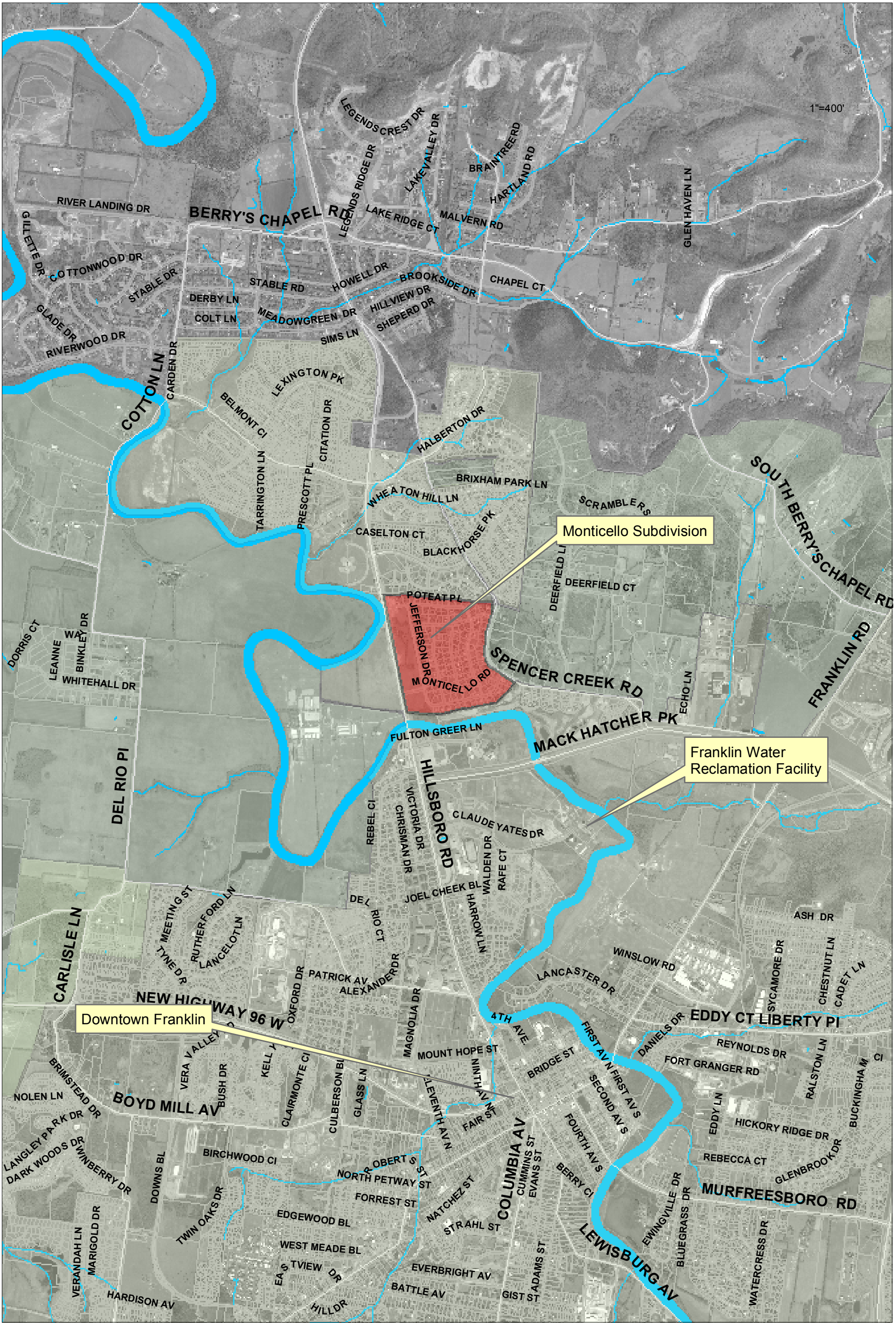
Septic systems were never intended to serve as a permanent solution for residential sewer service, but as a temporary measure until a sanitary sewer connection could be furnished. There is a history of problems and repairs to septic systems within the Monticello subdivision. This study recommends that the City pursue the installation of

sanitary sewers to provide a permanent sewer solution for the residents of the subdivision. This work has been previously planned by the City, and, in light of recent construction cost increases, we recommend that the City pursue completion of the work before gas and oil prices further increase the projected cost of the project. This study also recommends that the Fieldstone Farms pump station Number 1 be evaluated for current performance parameters and possible renovations or upgrades to ensure that the station will be able to accommodate the additional flows generated from Monticello Subdivision.

TABLE 1

**Monticello Subdivision Gravity System
Preliminary Estimate of Construction Cost**
January 16, 2007

No.	Item Description	Qty	Units	Unit Cost	Total Cost
1	8" PVC Gravity Sewer	10,500	LF	\$58.00	\$609,000
2	4' Diameter Manholes	30	EA	\$3,000.00	\$90,000
3	Replace Asphalt Paving in Streets	25,000	SY	\$14.00	\$350,000
4	Sanitary Sewer Service Line	3,000	LF	\$25.00	\$75,000
5	Sanitary Sewer Service Connections	109	EA	\$1,200.00	\$130,800
6	Abandon Existing Septic Tanks	109	EA	\$1,600.00	\$174,400
	Total Estimated Construction Cost				\$1,429,200
	Engineering/ Contingencies (15%)				\$214,380.0
	Total Estimated Cost				\$1,643,580



Legend

- Franklin City Limits
- Franklin UGB
- Study Area

1 inch equals 2,000 feet

CITY OF FRANKLIN
MONTICELLO SEWER STUDY
MONTICELLO SUBDIVISION LOCATION

EXHIBIT 1

SSR Smith Seckman Reid, Inc.
2995 Sisco Drive
Nashville, TN 37204
615.383.1113
www.ssr-inc.com



Legend

- Existing Sanitary Sewer
- Properties With Sewer Service
- Common Open Space
- Properties Without Service
- Proposed 8" Gravity Sewer

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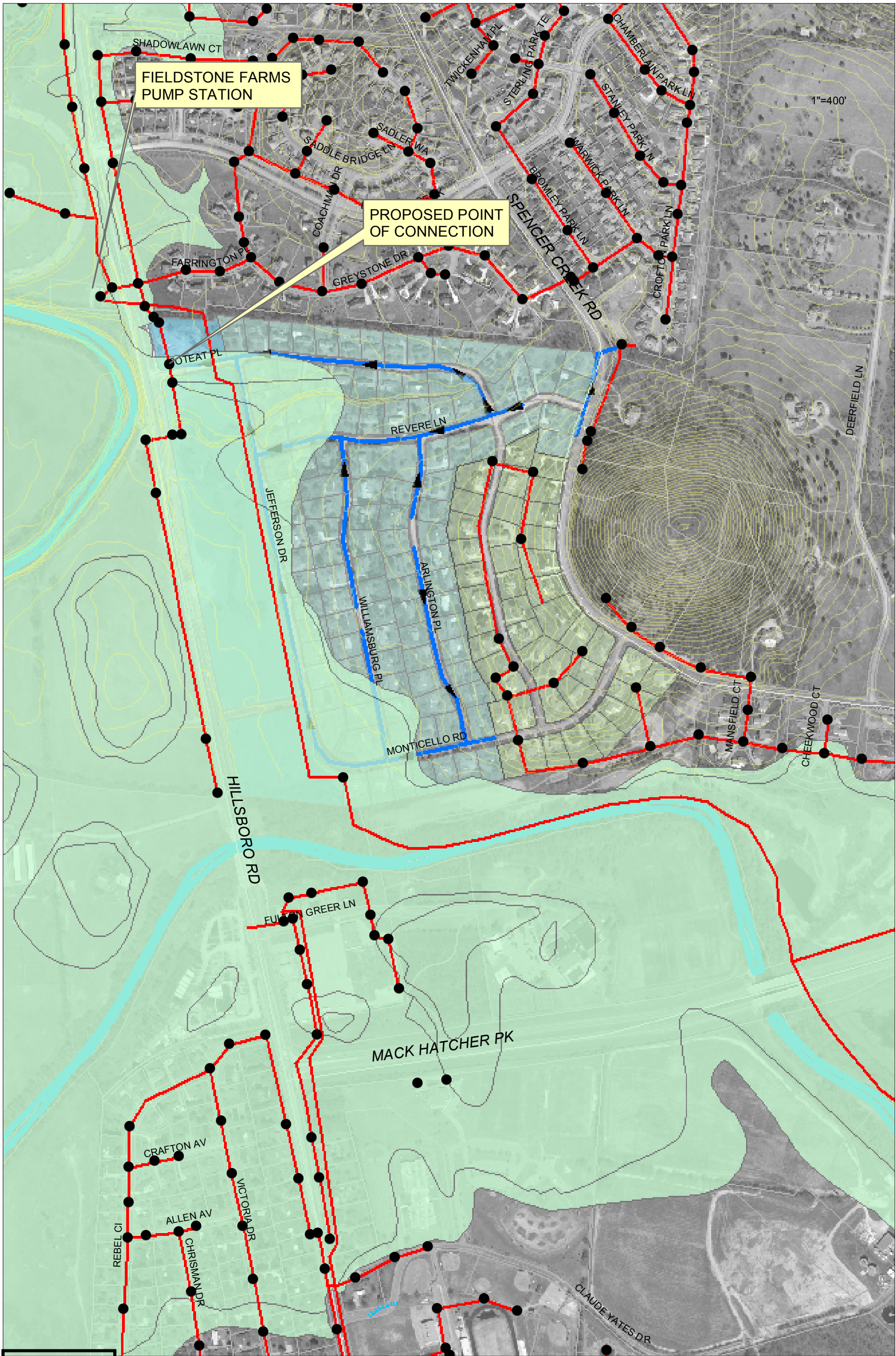
1 inch equals 500 feet

**CITY OF FRANKLIN
MONTICELLO SEWER STUDY
PROPOSED SANITARY SEWER COLLECTION SYSTEM**

EXHIBIT 3

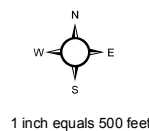
SSR Smith
Seckman
Reid, Inc.

2995 Sidco Drive
Nashville, TN 37204
615.383.1113
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Legend

- Existing Sanitary Sewer
- 100-Year Flood Plane
- Properties With Sewer Service
- Common Open Space
- Properties Without Service
- Proposed 8" Gravity Sewer



**CITY OF FRANKLIN
MONTICELLO SEWER STUDY
EXISTING 100-YEAR FLOOD PLANE**

EXHIBIT 4

SSR Smith Seckman Reid, Inc.
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